

White Paper:

Coalbed Methane Legislation and Recovery
in Alabama, Pennsylvania, Virginia, and
West Virginia

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1.0 Introduction

Coal is a major energy resource in the United States, accounting for 44 percent of all electricity generation (EIA, 1995). A significant byproduct of coal formation is coalbed methane (CBM), a natural gas resource comprising five percent of total United States gas reserves. CBM remains trapped in undisturbed coal seams. Penetration of a coal seam through mining or gas well development releases CBM. Coal mines vent the majority of CBM they encounter to the atmosphere. Unburned methane is a significant greenhouse gas, second only to carbon dioxide in overall global warming impact. In fact, on an equivalent mass basis, methane has a global warming potential twenty-one times that of carbon dioxide.

This paper reviews the correlation between state-sponsored legislation and CBM resource recovery in four major coal mining states -- Alabama, Pennsylvania, Virginia, and West Virginia. These states have the highest methane emissions from coal mines in the United States (EPA, 1997). The data indicate that state-sponsored legislation designed to alleviate barriers to CBM resource recovery contributes to the development and implementation of CBM projects. Section 2 provides an overview of CBM legislative history for each state and the Federal Energy Policy Act of 1992's role in CBM use. Section 3 shows CBM reserves and production levels, and the resulting economic benefits for each state. Section 4 presents the key conclusions of the paper.

What is CBM?

As stated above, CBM is natural gas trapped in coal seams. The majority of CBM remains trapped in un-mined coal reserves. CBM released during coal mining, generally seeps into the mine mixing with the ventilation air. For safety reasons, coal operators must keep the concentration of CBM in a mine to within one percent of total air volume. Operators install ventilation systems and sometimes employ degasification technology to rid the mine of the CBM. Ventilation systems consist of large fans that dilute the mine air with air from the surface. Degasification technology generally involves drilling wells either vertically from the surface or horizontally within the mine to exhaust the methane prior to the mining of the coal.

In most cases, coal mine operators vent CBM into the atmosphere. Mine operators and gas developers can, in many cases, economically recover this CBM for processing and marketing. CBM can be sold to natural gas distribution companies, used for electric power generation, consumed at the mine, or sold to local industry. Capturing and utilizing CBM from active mining operations cost-effectively reduces emissions of greenhouse gases, while simultaneously providing local jobs and tax revenue. Alabama and Virginia both have enacted CBM legislation and have significant CBM industries.

Why do States Enact CBM Legislation?

A gas developer cannot produce CBM without accessing the coal seam. Likewise, the coal operator must remove the CBM in order to mine coal. This unique relationship between coal and CBM has led to many legal disputes. These disputes have arisen because separate

parties often own land rights, coal rights, and gas and oil rights, and often none have clear legal ownership of the CBM. Several states have passed laws clarifying the relationship between coal, gas, oil and CBM, which have had a major impact on CBM resource recovery.

State legislatures pass CBM legislation to reduce the barriers to developing and implementing projects. The primary issues addressed by these laws include:

- **Ownership:** Several parties may have legitimate claims to CBM rights. Claimants may include the coal rights owner, oil and gas rights owner, and/or the landowner. To date, all CBM legislation examined in this report includes a “forced pooling” provision, which allows development of the project while the parties resolve an ownership dispute. A claimant may apply to the state for a pooling order. If the state acts on the request, in some cases it may designate an operator to develop the site and will set up an escrow account for the costs and proceeds. Once the claimants settle the dispute, either judicially or voluntarily, the state typically issues a revised division order distributing all amounts from the escrow account to the legally entitled owner(s) (McClanahan, 1995).
- **Well Spacing:** States regulate spacing between wells, buildings, or property lines. These regulations ensure that wells produce efficiently without interfering with the production of neighboring wells or posing a threat to nearby property. Most states establish standard distance requirements. The regulatory agency often allows exceptions to these standards based on the unique characteristics of a particular gas field.
- **Protection of Coal Seam:** Protecting the integrity of the coal seam assures coal operators that gas producers will recover the CBM without damage to coal resources. Most CBM legislation mandates public hearings to provide coal operators and others the opportunity to object to the project during the application process. Most legislation also requires the gas producer to notify nearby coal operators prior to drilling.
- **Coal Mine Safety:** To ensure miner safety, all CBM projects, operating near an active coal mine, must observe state and federal mining regulations. Gas producers drilling within 300 feet of an active mine, must submit a map showing the drilling site and a safety plan to the federal Mine Safety and Health Administration (MSHA). Depending on the state, the gas producers also must notify the mine operator during various phases of CBM drilling and production.

2.0 CBM Legislation

A History of CBM Legislation

CBM production began in the early 1980s, fueled primarily by Section 29 of the Federal Windfall Profits Act of 1980 (Non-conventional Fuels Tax Credit) for wells drilled between 1980 and 1992. In 1997, the act provided a tax credit of \$1.02 per million British thermal units (Btu) of CBM recovered, almost half the price of gas (Walker, 1997). Figure 1 presents

data which indicate that developers in regions without state-sponsored CBM legislation did not benefit from the federal tax credits.

The first state to act was Alabama in 1983, and it experienced dramatic growth in production throughout the 1980's and 1990's, as shown in Figure 1. CBM represents 22% of total 1995 gas production in Alabama, the seventh largest United States gas supplier. In 1990, Virginia enacted the "Virginia State Oil and Gas Act." In 1990, CBM production was negligible in Virginia. Just five years later, CBM was Virginia's largest source of natural gas, representing 66% of their gas production. In 1994, West Virginia adopted a CBM article into law which created guidelines for CBM development. West Virginia's growth in CBM drilling permits tripled from 1992 to 1996. It is too early for published materials to record the growth in gas production, but recent projections indicate growth in the production of CBM from West Virginia.

The U.S. Congress used Virginia's legislation as the basis for CBM statutes in the National Energy Policy Act of 1992 (EPACT). The federal government limited Section 1339 of EPACT, titled *Ownership of Coalbed Methane*, to "Affected States," where either the U.S. government owns a significant amount of coal resources or no CBM legislation existed. EPACT designated Illinois, Indiana, Kentucky, Ohio, Pennsylvania, Tennessee, and West Virginia as affected states. EPACT allowed these states three years to develop CBM legislation of their own, otherwise, the CBM provisions of the federal legislation would become effective in the affected states. Thus, EPACT effectively created a default program, by which the federal government would enact CBM ownership legislation if an affected state did not implement its own program (McClanahan, 1995).

The legislatures of affected states could formally request removal from EPACT's list of affected states by establishing state CBM guidelines or by simply opting out of EPACT's CBM provisions. In 1994, the federal government granted removal from affected state status for West Virginia because the state established CBM legislation. In 1995, Indiana, Ohio, and Pennsylvania used the option clause to request removal from the list of affected states just before the federal government implemented the law. None of the latter states enacted a CBM law or program (McClanahan, 1995).

Table 1 summarizes the major statutes contained in federal and state CBM legislation. The first two types of provisions are key issues for CBM development – statutory CBM guidelines and pooling provisions. Statutory CBM guidelines create a legal framework for CBM development that gives CBM developers a basis for legal recourse. Specifically, if competing CBM interests arise, pooling provisions allow CBM drilling and recovery activities to continue, while the mineral ownership issue is legally resolved. Provisions of well spacing, protection of coal operations, coal mine safety, environmental protection, and well plugging address technical mineral recovery and resource issues that are important to CBM development.

3.0 Impact of Legislation on CBM Resource Development in Alabama, Pennsylvania, Virginia, and West Virginia

Section 2.0 illustrated that CBM legislation preceded substantial increases in new CBM development. Figure 1 shows the dramatic rise in CBM recovery that occurred in Alabama

and Virginia after these states enacted CBM legislation. The growth of the CBM industry yields positive regional economic benefits, including the creation of jobs in gas production, infrastructure development, indirect support services, and the generation of revenue for state and local economies (EPA, 1994). Areas with CBM development also benefit from increased investments in expanded support services, better gas recovery capabilities, more energy for economic growth, and savings in coal production costs from reduced levels of methane in pre-drained mines (Gunther, 1989). In the case of Alabama, Gary Wilson, Deputy Director of the Alabama Oil and Gas Board, offers this observation: "I can state without hesitation that the development of the CBM industry has been very positive to Alabama. The numbers speak for themselves, and we are very pleased to be a part of the development of this industry by being in the forefront in the enactment of CBM legislation."

States that take legislative action to define CBM and address ownership issues benefit economically. As Table 2 shows, EPA conservatively estimates that Alabama and Virginia now offer 700 and 200 new CBM related jobs, respectively (EPA, 1994). The growth of the CBM industry creates a basis for further regional economic and job growth, especially in rural areas where unemployment levels tend to be high. Additionally, CBM tax revenues in Alabama and Virginia are estimated at \$10.3 and \$1.7 million, respectively. The CBM industry represents a new source of tax revenue for state and local governments.

States that have not enacted CBM legislation show little benefit from the commercial development of CBM resources. West Virginia and Pennsylvania have marginal CBM industries. However, recent data indicate that developers are implementing more CBM projects in West Virginia as evidenced by the increase in drilling activity since the passage of recent CBM laws.

Estimates of CBM reserves in Alabama, Pennsylvania, Virginia, and West Virginia demonstrate the potential for growth in CBM production. The technically recoverable CBM reserves in Alabama and Virginia are estimated at 2.5 trillion cubic feet (Tcf) and 1.0 Tcf, respectively, while the estimated reserves for Pennsylvania and West Virginia are 4 Tcf and 5 Tcf, respectively¹. While Alabama's recoverable CBM resources are approximately one-fourth that of Pennsylvania's and West Virginia's combined, Alabama's 1996 commercial production of CBM was approximately 100 times greater.

¹ The U.S. Geological Survey estimates the CBM reserves in the Appalachian Basin at 11 Tcf (Lyons, 1997). Of this 11 Tcf, Pennsylvania is estimated to have 4 Tcf, West Virginia has approximately 5 Tcf, and Kentucky and Ohio make up the remainder. This distribution represents preliminary estimates, as exact state data on the distribution of the CBM reserves is presently not available.

Figure 1
Legislative Impact on CBM Production

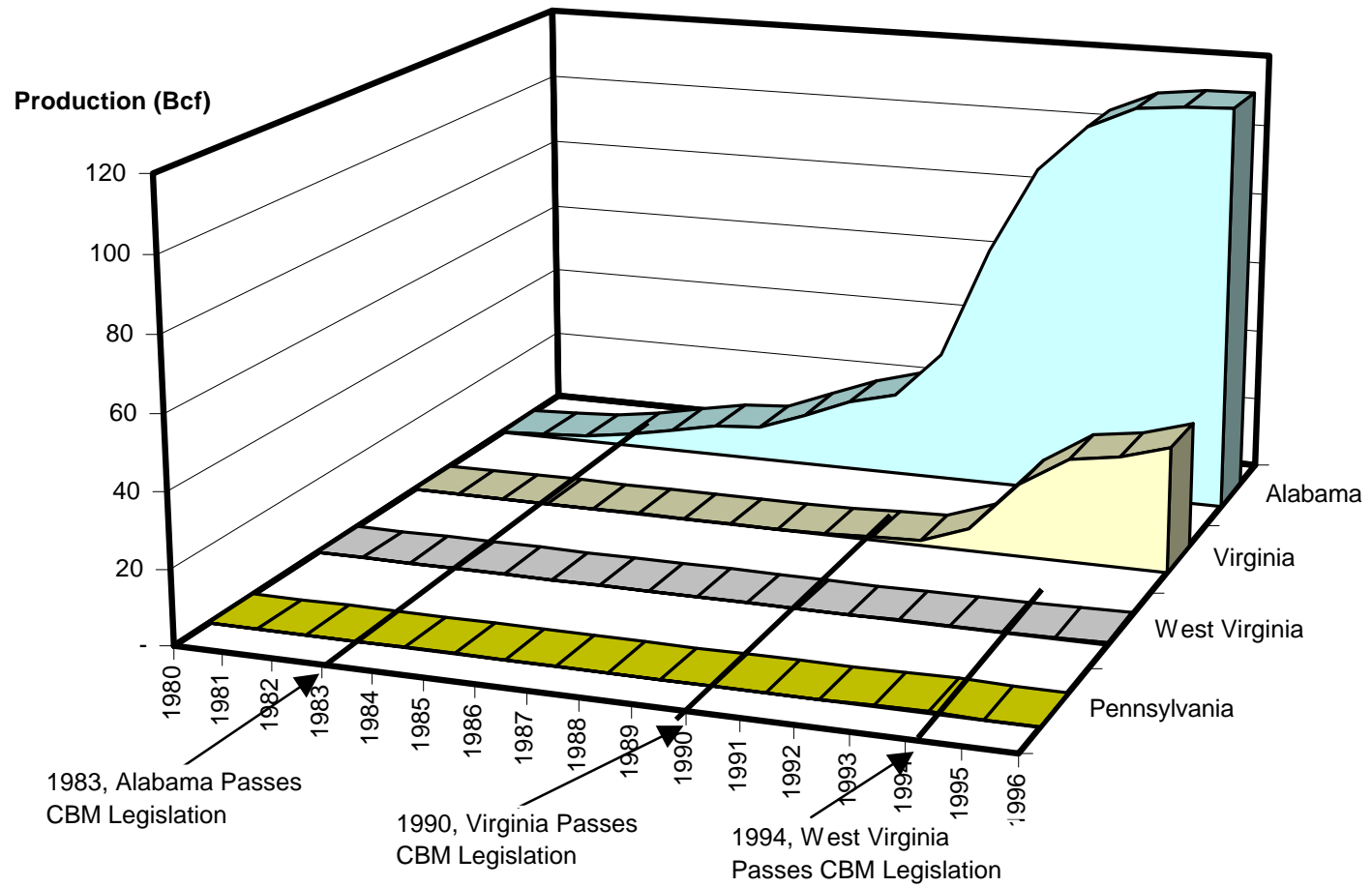


Table 1
Summary of Coalbed Methane Legislation in
Alabama, Pennsylvania, Virginia, West Virginia, and EPACT

Provision	Purpose	Alabama	Pennsylvania	Virginia	West Virginia	EPACT
Coalbed Methane Development Legislation	Recognizes CBM as a unique resource, addresses ownership, spacing, and coal mine protection.	1983		1990	1994	1992
Ownership Protection	Reduces barriers to CBM development caused by disputes of CBM ownership rights.	X		X	X	X
Forced Pooling	Part of ownership statutes, pooling allows production to continue as the parties adjudicate ownership disputes.	X		X	X	X
Well Spacing	Prevents production interference between wells and protects surrounding property.	X	X	X	X	X
Protection of Coal Operations	Ensures that the operator extracts the CBM without damaging current or future mine operations.	X	X	X	X	X
Coal Mine Safety	Ensures that CBM development will not endanger the safety of miners working nearby.	X	X	X	X	X
Environmental Protection	Protects nearby streams, wetlands, and ground water.	X	X	X	X	
Well Plugging	Requires the operator to seal (or plug) wells after completing production.	X	X	X	X	X

Note: Pennsylvania regulates CBM as a natural gas. The state has no CBM-specific legislation recognizing its unique relationship with coal and taking into account ownership issues. *Sources:* Alabama Administrative Code, section 400.4, Rules and Regulations Governing the Permitting, Drilling, and Production of Coalbed Methane Gas (1996); Pennsylvania Oil and Gas Operators Manual (Department of Environmental Protection, 1997); Virginia State and Oil Gas Act (1990); West Virginia Coalbed Methane Wells and Units Article of the Environmental Resources Act (1994).

Table 2 Estimates of CBM Production and Resulting Benefits				
State	CBM Legislation Passed	1996 CBM Production (Bcf/yr)	Resulting Jobs	Resulting Revenue (\$ millions)
Alabama	1983	112.9	700	10.3
Pennsylvania	No	0.4	<10	<0.1
Virginia	1990	34.2	200	1.7
West Virginia	1994	0.7	<10	<0.1
Assumptions: The number of jobs is based on 6 jobs per billion cubic feet (Bcf) of coalbed methane per year (EPA, 1994). Resulting revenue is based on the following assumed tax rates, natural gas prices: Alabama: 5%, \$1.82/thousand cubic feet (mcf); Pennsylvania: 4%, \$2.80/mcf; Virginia: 5%, \$1.70/mcf; West Virginia: 6%, \$2.20/mcf (EPA, 1997a and EIA, 1997). Source: EPA, 1994, 1997b. Information adapted from recent EPA CBM mine profile documents.				

4.0 Conclusion

Opportunities for economic growth abound in coal producing states with significant CBM reserves. Coal operators must vent CBM from coal mines. Gas developers can capture and market this CBM as a clean energy source. States benefit through job creation and increased tax revenue. The global environment benefits from a reduction of greenhouse gases.

The data presented in this paper suggest that legislation addressing ownership and other issues can help foster the development and implementation of CBM projects. The passage of CBM legislation in Virginia and Alabama preceded a dramatic increase in CBM resource recovery. Other states with similar CBM reserves have the opportunity to develop this valuable resource, create jobs and protect the environment through legislative initiatives they design to reduce barriers to CBM project development.

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